

Delta Export Reductions in December 2000 and January 2001

Description

Curtail total Delta Central Valley Project/State Water Project (CVP/SWP) exports during critical outmigration period (December and January) to increase survival of outmigrating juvenile chinook salmon from the Sacramento basin, including the recently listed spring-run chinook salmon and steelhead, and candidate late-fall and fall-run. This action is to confirm the potential benefits of export curtailment to salmon survival in the delta using coded-wire tagged (CWT) late fall run salmon from Coleman National Fish Hatchery. Adult delta smelt and Sacramento splittail also are migrating upstream to spawning areas at this time.

Purpose (Biological Benefits and Justification)

This action will increase the survival of juvenile chinook salmon smolts (including yearling spring-run chinook salmon) migrating through the Delta in the winter. It is scientifically supported by several years of mark/recapture data that indicates the survival of juvenile late fall-run chinook salmon in the central Delta decreases as exports increase ($r^2 = 0.47$, $p < 0.1$). A December or January 10 to 14 day export reduction will also provide experimental conditions to further refine the relationship between export and juvenile survival in the central Delta. These export reductions will supplement the primary protective action of closing the DCC gates during this period.

Real-Time Implementation Process

Delta export reductions will be initiated by the CALFED managing agencies in coordination with the project agencies, by following the recently developed 2000 Oct-Jan juvenile salmon protection plan with its inherent trigger guidelines for DCC closure and export curtailment and consideration of delta water quality conditions. Short term (5 day) export curtailments will occur in December and/or January when abundance peaks of salmon entering the delta are not expected last. When high delta inflows from the Sacramento basin are expected to last longer than 7 days and salmon abundance is high, total Delta exports will be reduced to approximately 2,000 - 4,000 cfs for 10-14 consecutive days in either December or January when the survival of CWT fish will be measured.

Decisions regarding the modification of export rates with (b)(2) and EWA water will be made in coordination with the DAT, B2IT, the CALFED agencies and WOMT.

Potential (b)(2) and EWA Costs

Approximately 200,000 acre-feet (AF) of potential export reductions in December, and approximately 100,000 AF of potential export reductions in January.

Delta Export Reductions in February and March 2001

Description

Curtail total Delta Central Valley Project/State Water Project (CVP/SWP) exports during critical outmigration period (February and March) to increase survival of outmigrating juvenile chinook salmonids from the Sacramento basin with a focus on ESA listed winter-run and steelhead trout. Adult delta smelt and Sacramento splittail also are migrating upstream to spawning areas at this time.

Purpose (Biological Benefits and Justification)

This action will increase the survival of juvenile salmonid smolts migrating through the Delta in the late winter. It is scientifically supported by several years of mark/recapture data that indicates the survival of juvenile late fall-run chinook salmon in the central Delta decreases as exports increase ($r^2 = 0.47$, $p < 0.1$). These export reductions will supplement the primary protective action of a closed DCC gates during this period. Curtailed exports also decrease ESA incidental take of important spawning adult delta smelt and Sacramento splittail when these species are in the south/central Delta.

Real-Time Implementation Process

Delta export reductions will be initiated by the managing agencies, in coordination with the project agencies, by following the to be developed February-March juvenile salmon protection plan which will include trigger guidelines for export curtailment. The plan is expected to include short term (5 day) export curtailments when abundance peaks of smolt sized salmon and steelhead reach trigger levels at Sacramento, Mossdale and/or the CVP/SWP fish facilities.

Decisions regarding the modification of export rates with (b)(2) and EWA water will be made in coordination with the DAI, B200, the CALFED agencies and WOMT.

Potential (b)(2) and EWA Costs

There is a placeholder of approximately 100,000 acre-feet (AF) of potential export reductions in February and March using EWA assets in the 50% forecast. There is no placeholder for using potential (b)(2) water during this time.

Delta Export Reductions in April and May 2001

Description

Curtail total Delta CVP/SWP exports during April and May (critical outmigration period for juvenile fall-run chinook salmon). Specific flow releases from the Stanislaus, Tuolumne, and Merced rivers and specific export curtailments consistent with the San Joaquin River Agreement and Vernalis Adaptive Management Plan (VAMP) will occur during 31 days generally from mid April to mid May and include a barrier at the head of Old River.

Purpose (Biological Benefits)

Consistent with the San Joaquin River Agreement and Vernalis Adaptive Management Plan (VAMP), this action will evaluate the relative effects of export and inflow to juvenile San Joaquin basin chinook salmon survival and assist in providing protection for both anadromous and estuarine species.

The scientific support for flow increases in the San Joaquin Delta is based on positive, significant relationships between CWT juvenile smolt survival and Delta inflow ($r^2 = 0.60$, $p < 0.05$) and between adult salmon escapement and spring flows 2 ½ years earlier ($r^2 = 0.50$, $p < 0.01$). The ratio of flow at Vernalis to Delta exports is significantly, positively correlated to the number of naturally spawning salmon 2 ½ years earlier ($r^2 = 0.40$, $p < 0.01$). The escapement for the Stanislaus and Tuolumne River per unit of spring flow has decreased since combined operations of the CVP and SWP, indicating negative effects of Delta exports to San Joaquin basin salmon production. Correlation analyses indicate that inflow to the Delta, low tributary flows during smolt migration, and adult escapement levels below 1,000 fish account for most of the variation in salmon production in the Stanislaus and Tuolumne Rivers.

Closure of the barrier at the head of Old River in the April/May period provides a two fold increase in the survival of San Joaquin basin juvenile salmonid outmigrants by keeping them in the mainstem San Joaquin River as indexed using CWT salmon mark/recapture data.

Real-Time Implementation Process

Consistent with VAMP. If sufficient b-2 or EWA water is available on May 15th the FWS, in coordination with NMFS and CDFG may request exports continue at some reduced stable level or allow exports to ramp up between May 16th and June 1st. These additional days of reduced exports will provide additional protection for juvenile anadromous and resident estuarine species (including delta smelt). If additional protection for either juvenile anadromous or resident species is needed prior to April 15, (b)(2) or EWA may be used for the modification of exports.

Potential (b)(2) and EWA Costs

90% forecast - approximately 320,000 acre-feet (AF)
50% forecast - approximately 425,000 AF

Delta Export Reductions in June 2001

Description

Curtail total Delta CVP/SWP exports during June to decrease losses of juvenile delta smelt and splittail if their incidental take approaches "red light". Also, a gradual increase (ramp up) rather than a rapid increase of export during June may be used to increase survival of both anadromous and resident estuarine species in the south/central Delta.

Purpose (Biological Benefits)

To reduce the effects of CVP/SWP export facilities on listed resident fish in the south Delta and to enable juvenile resident estuarine and anadromous species to migrate away from the export facilities where they are less vulnerable to direct loss and/or indirect mortalities associated with export operations. Data exists that indicates "incidental take" is greater when fish population densities are high near the export facilities or when exports increase. Additional information indicates that generally when export rate increases rapidly under low delta inflow and fish densities are high in the south/central Delta that fish losses at the facilities can be great.

Real-Time Implementation Process

If sufficient b-2 or EWA water is available in June, the CALFED managing agencies (FWS, CDFG, and NMFS), in coordination with the project agencies (USBR and CDWR) may request exports continue at some reduced stable level or ramp up exports gradually in June. This request will be guided by the level of incidental take or by other "biological triggers" to be developed by the delta smelt project work team and/or a subteam of biologists from DAT membership. Specific export levels for these triggers also are to be developed by these teams.

Decisions regarding the modification of export rates with (b)(2) and EWA water will be made in coordination with the DAT, B2IT, the CALFED agencies and WOMT.

Potential (b)(2) and EWA Costs

90% forecast - There is a placeholder for potential export ramping or reductions of approximately 100,000 acre-feet (AF). There is not a placeholder for using EWA assets because the SWP exports are already low in the base case.

50% forecast - In addition to approximately 50,000 AF of potential (b)(2) use, there is a placeholder for approximately 100,000 AF of potential EWA use.

UPSTREAM RIVER RELEASES OCTOBER THROUGH SEPTEMBER

Description

Upstream actions are intended to provide increased flows in the CVP-controlled streams of Clear Creek, Sacramento, American, and Stanislaus rivers for improved habitat conditions for anadromous and resident fish populations, including benefits to chinook salmon and steelhead upstream migration, spawning, egg incubation, rearing, and downstream migration.

Purpose (Biological Benefits and Justification)

In general, the improved flows in CVP-controlled streams will: (1) provide improved spawning and rearing habitat for salmon and steelhead; (2) improve survival of downstream migrating chinook salmon smolts; (3) improve habitat conditions for white sturgeon, green sturgeon, American shad and striped bass to migrate upstream, spawn, and allow progeny to survive; (4) aid in the downstream transport of striped bass eggs and larvae; (5) improve water temperatures and increase habitat for rearing juvenile steelhead, and (6) benefit delta smelt and other estuarine species.

The rationale and scientific basis for the improved flows are found in a variety of sources (including AFRP documents, published literature, CDFG reports, and other restoration programs) and are generally based on results of instream flow and temperature studies conducted by the FWS, CDFG or others, as well as relationships between flow and adult returns, correlation analyses, and other life history information.

Real-time Implementation Process

The flow objectives being targeted for each CVP-controlled stream are consistent with the AFRP's May 1997 Revised Draft Restoration Plan. These flow objectives are higher than the current existing minimum flow requirements in each stream. The flow objectives being targeted will be based on thresholds of CVP reservoir storage and forecasted inflow, and the amount of (b)(2) water available to meet the objectives. The higher flow releases will be triggered by fisheries and hydrologic monitoring efforts. In general, spawning flows will be initiated in October or November when adult salmon are observed in the CVP-controlled streams and river temperatures are 60 degrees or less.

Potential (b)(2) and FWA Costs

90% forecast - approximately 200,000 (AF), depending on potential reset.
50% forecast - approximately 130,000 (AF), depending on potential reset.